contents

number 1

ECOLOGY

Anti-insect activity of plant extracts from the wild flora in south-eastern Spain
M. J. Pascual-Villalobos & A. Robledo 1

Narrow hybrid zone between two subspecies of big sagebrush, *Artemisia tridentata* (Asteraceae). VIII. Spatial and temporal pattern of terpenes
D. W. Byrd, E. D. McArthur, H. Wang, J. H. Graham & D. C. Freeman 11

SYSTEMATICS

2,3-Dihydrofarnesyl and citronellyl esters in the paracloacal gland secretions of the brown caiman (*Caiman crocodilus fuscus*) from Costa Rica
J. W. Wheeler, S. D. A. Ibrahim & P. J. Weldon 27

The polysaccharide composition of Poales cell walls: Poaceae cell walls are not unique
B. G. Smith & P. J. Harris 33

A phylogenetic and biogeographic study of *Hamamelis* (Hamamelidaceae), an eastern Asian and eastern North American disjunct genus
J. Wen & S. Shi 55

Low isozymic differentiation among five species of the *Macrozamia heteromera* group (Zamiaceae)
I. K. Sharma, D. L. Jones, P. I. Forster & A. G. Young 67

Flavonoids, DNA and relationships of *Itea* and *Pterostemon*
B. A. Bohm, J. Y. Yang, J. E. Page & D. E. Soltis 79

Flavone glycoside from three *Caralluma* species
M. Ramesh, Y. N. Rao, M. R. Kumar, G. K. Mohan, B. R. Kumar, A. V. N. A. Rao, M. R. Krishna & B. M. Reddy 85

Betaine distribution in the Amaranthaceae
G. Blunden, M.-H. Yang, G. Janicsak, I. Mathe & A. Carabot-Cuervo ... 87

NEW SOURCE REPORTS

2-methylcarboxylic acids in the interdigital glands of whitetail deer, *Odocoileus virginianus dacotensis*
W. F. Wood 93

Flavonoids from *Schmalhausenia nidulans* (Compositae): a taxon endemic to the Tien Sian Mountains
T. Iwashina & Y. Kadota 97

Constituents of *Mikania glomerata Sprengel*
R. C. S. Veneziani, D. Camilo & R. de Oliveira 99

Triterpenoids in lipophilic leaf and stem coatings
E. Wollenweber, M. Doerr, K. Siems, R. Faure, I. Bombarda & E. M. Gaydou 103

Shiromool 1,10-epoxides from *Teucrium stocksianum*
M. H. A. Yousuf, A. K. Bashir, T. A. Crabb, G. Blunden, M.-H. Yang ... 107

Alkaloids from *Orophea hexandra*
A. Sinz, R. Matusch & L. Witte 111

(*E,E*)-*N*-isobutyl-2,4-octadienamide from *Piper marginatum*
B. V. de Oliveira Santos, M. C. de Oliveira Chaves 113

number 2

Special Issue
Gene Expression In Reptilian Systematics

Editorial
D. G. Buth, & R. W. Murphy 115

The use of isozyme characters in systematic studies
D. G. Buth & R. W. Murphy 117

Evolution of L-lactate dehydrogenase gene expression in non-avian reptiles
R. W. Murphy 131

The systematic value of creatine kinase expression in reptiles
B. I. Crother, D. G. Buth & M. R. Tennant 147

The use of isozyme characters in systematic studies of turtles: preliminary data for Australian Chelids
C. S. Lieb, J. W. Sites, Jr. & J. W. Archie 157

Gene expression in the desert tortoise, *Gopherus agassizi*; tissue sources and buffer optima for the gene products of 73 loci
D. G. Buth & W. J. Rainboth 185

Superoxide dismutase expression in the lizard genus *Anolis*: systematic significance of a silenced gene
C. S. Lieb, D. G. Buth & M. Miyamoto 201

Limitations of the use of tissue-specific gene expression characters in the phylogenetic analyses of non-avian reptiles
R. H. Matson 213

number 3

SYSTEMATICS

Evolution of 2S albumin seed storage protein genes in the Brassicaceae
K. Boutilier, J. Hattori, B. R. Baum & B. L. Miki 223

Identification of Iberian and Canarian species of the genus *Pinus* with four isoenzyme systems
F. González-Andrés, J.-M. Pita & J.-M. Ortiz 235

Taxonomic implications of phenolic variation in leaves of birch (*Betula* L.) species
M. Keinänen, R. Julkunen-Tiitto, M. Rousi & J. Tahvanainen 243

Chemosystematic study on leaf volatile compounds of *Saxifraga* L. series Ceratophyllae (Saxifragaceae)
J. Esteban, I. Martínez-Castro, P. Vargas & J. Sanz 255

Essential oil variability of *Thymus baeticus* growing wild in south-eastern Spain
F. Sáez 269

Chemosystematic studies on the genus *Scalesia* (Asteraceae)
O. Spring, N. Heil & U. Eliasson 277

Phylogenetic and chemotaxonomic significance of diterpenes in some *Portulaca* species (Portulacaceae)
A. Ohsaki, K. Shibata, T. Kubota & T. Tokoroyama 289

Chemotaxonomic evaluation of leaf alkanes in species of *Lupinus* (Leguminosae)
E. F. Merino, D. M. Maestri & A. M. Planchuelo 297

NEW SOURCE REPORTS

Flavonoids glycosides of *Polygonum stelligerum* Cham.
C. F. P. Sartor, C. C. da Silva & M. C. de Souza 303

Flavonoid and terpene glycosides from European *Ebenus* species
D. Mitrocotsa, A.-L. Skaltsounis, S. Mitaku, C. Harvala & F. Tillequin.... 305

Two new quercetagetin O-glucosides from *Tagetes mandonii*
F. Senatore, M. D'Agostino & I. Dini 309

Limonoids and diterpenoids from *Dysoxylum spectabile* (Meliaceae)
D. A. Mulholland, T. V. Monkhe, K. H. Pegel & D. A. H. Taylor..... 313

Steroidal saponin, 7-oxostigmasterol and diterpenes from *Aspilia montevidensis*
A. A. Bellini, D. C. R. de Oliveira & W. Vichnewski..... 317

Acidic triterpene glycosides in trichome secretions differentiate subspecies of *Combretum collinum* in South Africa
C. B. Rogers & P. H. Coombes..... 321

Cepharanone B from *Piper tuberculatum*
J. X. de Araújo Júnior, M. C. de Oliveira Chaves & E. V. Leitão da-Cunha, A. I. Gray 325

Consistent production of penigequinolone A and B by *Penicillium scabrosum*
T. O. Larsen, J. Smedsgaard, J. C. Frisvad, U. Anthoni & C. Christophersen 329

number 4

Special Issue
Robert Hegnauer – A Celebration of his Major Work, "Chemotaxonomie der Pflanzen"

Robert Hegnauer – a celebration of his major work, "Chemotaxonomie der Pflanzen" 333

The comparative biochemistry of phytoalexin induction in plants
J. B. Harborne 335

A comparison between chemical and molecular characters for the determination of phylogenetic relationships among plant families: An appreciation of Hegnauer's "Chemotaxonomie der Pflanzen"
R. J. Grayer, M. W. Chase & M. S. J. Simmonds 369

The chemical systematics of alkaloids: A review emphasising the contribution of Robert Hegnauer
P. G. Waterman 395

Biosystematic, molecular and phytochemical evidence for the multiple origin of sympetaly in Eurasian Sedoideae (Crassulaceae)
H. 't Hart, R. D. H. J. van Ham, J. F. Stevens, E. T. Elema, H. van der Klis, & T. W. J. Gadella 407

Jahreszeitliche Schwankungen von Flavonoidgehalten in Laubmoosen
E. Brinkmeier, H. Hahn, T. Seeger, H. Geiger & H. D. Zinsmeister 427

Chemotaxonomic relevance of sesquiterpenes within the *Achillea millefolium* group
W. Kubelka, U. Kastner, S. Glasl, J. Saukel & J. Jurenitsch 437

Condensed vegetable tannins: Biodiversity in structure and biological activities
T. D. Bruyne, L. Pieters, H. Deelstra & A. Vlietinck 445

number 5

Mitochondrial cytochrome oxidase I sequence divergence in some Chinese species of *Charybdis* (Crustacea: Decapoda: Portunidae)
K. H. Chu, J. Tong & T.-Y. Chan 461

Phylogenetic relationships of the suckermouth minnows, genus *Phenacobius*, inferred from parsimony analyses of nucleotide sequence, allozymic and morphological data (Cyprinidae: Cypriniformes)
W. W. Dimmick & B. M. Burr 469

Allozyme variation in European silurid catfishes, *Silurus glanis* and *Silurus aristotelis*
A. Triantafyllidis, C. Ozouf-Costaz, P. Rab, R. Suciu & Y. Karakousis ... 487

Characterisation of natural hybrids between *Pterostylis alveata* Garnet and *Pterostylis ophioglossa* R. Br. (Orchidaceae) by starch gel electrophoresis
I. K. Sharma & D. L. Jones 499

Plicataloside in *Aloe* – a chemotaxonomic appraisal
A. M. Viljoen, B.-E. van Wyk & L. E. Newton 507

Coixol: a bioactive principle from a marine sponge *Oceanapia* sp
Y. Venkateswarlu, N. Srinivasa Reddy, P. Ramesh & J. Venkateswara Rao 519

Benzaldehyde and benzyl alcohol, the odour compounds from *Agaricus smithii*
W. F. Wood & D. L. Largent 521

Leaf exudate flavonoids of *Achillea sibirica* subsp. *mongolica* and *A. latiloba* (Compositae – Anthemideae)
K. M. Valant-Vetschera & E. Wollenweber 523

Flavonoids and triterpenoids from *Licania heteromorpha* (Chrysobalanaceae)
A. Braca, N. De Tommasi, J. Mendez & I. Morelli 527

Coumarins from the roots and stem bark of *Metrodorea flavida*
R. Pernin, F. Muyard, F. Bévalot, F. Tillequin & C. Moretti 531

6-Substituted-7-oxygenated coumarins from the leaves of *Micromelum minutum*
M. H. Sohrab, C. M. Hasan & M. A. Rashid 535

2,4,5-Trimethoxypropiophenone from *Piper marginatum*
B. V. de Oliveira Santos & M. C. de Oliveira Chaves 539

A diterpene, a sesquiterpene and a flavonol glycoside from *Piptostigma fasciculata* (Annonaceae)
V. Seidel, F. Bailleul & P. G. Waterman 543

Constituents of *Grazielia gaudichaudiana* (Asteraceae)
S. H. Taleb, D. C. Rodrigues de Oliveira & J. L. C. Lopes 547

number 6

ECOLOGY

Very long chain polyunsaturated fatty acids in crustacea of the order Bathynellacea
T. Řezanka & V. M. Dembitsky 551

SYSTEMATICS

Evaluation of the genetic diversity of *Salvia fruticosa* Mill. clones using RAPD markers and comparison with the essential oil profiles
M. Skoula, I. E. Hilali & A. M. Makris 559

Isoenzyme diversity and phylogenetic affinities among the African beans of the genus *Vigna* Savi (Fabaceae)
V. Jaaska 569

Contrasting patterns of genetic structure in the South African species *Androcymbium bellum, A. guttatum* and *A. pulchrum* (Colchicaceae)
J. Caujapé-Castells, J. Pedrola-Monfort & N. Membrives 591

Prunasin 6′-malonate from *Lotononis fruticoides* and *Lotononis* aff. *falcata* (Fabaceae)
M. Lechtenberg, A. Nahrstedt, A. M. Brinker, D. S. Seigler, K. Readel .. 607

The occurrence of the anti-cancer diterpene taxol in *Podocarpus gracilior* Pilger (Podocarpaceae)
R. Stahlhut, G. Park, R. Petersen, W. Ma & P. Hylands 613

Floral anthocyanins in wild taxa of *Petunia* (Solanaceae)
T. Ando, N. Saito, F. Tatsuzawa, T. Kakefuda, K. Yamakage, E. Ohtani, M. Koshi-ishi, Y. Matsusake, H. Kokubun, H. Watanabe, T. Tsukamoto, Y. Ueda, G. Hashimoto, E. Marchesi, K. Asakura, R. Hara & H. Seki ... 623

Flavonoid and phenolic acid patterns in seven *Hieracium* species
S. D. Petrovic, R. Löscher, M. S. Gorunovic & I. Merfort 651

The flavonoid chemosystematics of two *Teucrium* species from Southern Sinai, Egypt
S. A. Kawashty, E. M. Gamal El-Din & N. A. M. Saleh 657

NEW SOURCE REPORTS

A 2-methylene-β-alanine methyl ester derivative from the soft coral *Sinularia dissecta*
P. Ramesh, N. Srinivasa Reddy, T. Prabakar Rao, J. Venkateswara Rao & Y. Venkateswarlu 661

The chemistry of *Bacidia stipata* (Lichens, Ascomycotina)
M. Piovano, G. Guzman, J. A. Garbarino & M. C. Chamy 663

Geranylgeraniol and geranylgeraniol-derived diterpenes from the brown alga *Bifurcaria bifurcata* (Cystoseiraceae)
G. Culioli, V. Mesguiche, L. Piovetti & R. Valls 665

β-Dihidroplumericinic acid from *Himatanthus phagedaenicus*
M. P. Veloso, T. J. Nagem & T. T. de Oliveira 669

number 7

ECOLOGY

Seasonal changes in chemical composition of epicuticular waxes from the leaves of *Baccharis linearis*
F. Faini, C. Labbé & J. Coll 673

SYSTEMATICS

Sibmating in a small, isolated population of the dioecious plant species *Mercurialis ovata*
R. Holderegger & I. Stehlik 681

Line-scatter plots in chemotaxonomy of *Genista* L. Section *Spartioides* Spach in Western Europe
I. van Rensen, M. Veit, U. Röhner-van Rensen, P. Cantó, H. Vogt, R. Greinwald & F.-C. Czygan 687

Systematics of multi-seeded eastern hemisphere *Juniperus* based on leaf essential oils and RAPD DNA fingerprinting
R. P. Adams 709

Jaceidin and chrysosplenetin chemotypes of *Chamomilla recutita* (L.) Rauschert
M. Repčák, V. Švehlíková, J. Imrich & K. Pihlaja 727

Comparative studies of the rosmarinic and caffeic acid contents of Lamiaceae species
G. Janicsák, I. Máthé, V. Miklóssy-Vári & G. Blunden 733

Chemotaxonomic features in Argentinian species of *Flaveria (Compositae)*
A. M. Agnese, S. N. Montoya, L. A. Espinar & J. L. Cabrera 739

Nitro compounds in *Astragalus* species from Iran
H. Ebrahimzadeh, V. Niknam & A. A. Maassoumi 743

NEW SOURCE REPORTS

Flavonoids of the aerial parts from *Tagetes lucida* (Asteraceae)
L. R. Abdala 753

Major exudate flavonoids of *Dubautia arborea* (Asteraceae)
B. A. Bohm 755

A rare diterpene from *Jatropha gossypifolia*
B. Das & B. Venkataiah 759

number 8

ECOLOGY

Maackiain in *Cicer bijugum* Rech. f. associated with resistance to Botrytis grey mould
P. C. Stevenson & M. P. Haware 761

Organ-specific distribution of dietary alkaloids in the marine opisthobranch *Tylodina perversa*
R. Ebel, A. Marin & P. Proksch 769

Floral nectar chemical composition of some species from Patagonia. II
G. Bernardello, L. Galetto & A. Forcone 779

SYSTEMATICS

Genetic variation (protein markers and microsatellites) in endangered Catolonian donkeys
J. Jordana, P. Folch & A. Sanchez 791

Genetic diversity in natural *Cupressus sempervirens* L. populations in Turkey
S. Raddi & S. Sümer 799

Use of gas chromatograms of essential leaf oils to compare eight taxa of genus *Angophora* (Myrtaceae): possible relationships to the genus *Eucalyptus*
P. J. Dunlop, C. M. Bignell, M. I. H. Brooker, J. J. Brophy & D. B. Hibbert 815

NEW SOURCE REPORTS

Depsidones from *Anomalographis madeirensis*
A. G. González, C. Hernández, E. M. Rodríguez, M. del Carmen Alfayate, J. Bermejo 831

Alkaloids from three *Senecio* species
A.-L, Pérez-Castorena, A. Arciniegas, J. L. Villaseñor, A. R. de Vivar ... 835

Alkaloids of the genus *Turbinicarpus* (Cactaceae)
R. Štarha, A. Chybidziurová & Z. Lacný 839

Hypolaetin 8-O-glucuronide and related flavonoids from *Lavandula coronopifolia* and *L. pubescens*
I. El-Garf, R. J. Grayer, G. C. Kite & N. C. Veitch 843